

EXECUTIVE SUMMARY

WALLEYE SPAWNING EVALUATION PINE LAKE, 1994

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EXECUTIVE SUMMARY

Pine Lake is a small lake with a surface area of 389 ha located approximately 35 km south-east of the City of Red Deer. Pine Lake has many campgrounds and cottages surrounding its shoreline and is intensively used by recreationalists, including sport fishermen throughout the year.

Northern pike (*Esox lucius*) and yellow perch (*Perca flavescens*) are the only sport fish species native to Pine Lake. Walleye (*Stizostedion vitreum*) were stocked into Pine Lake many times since 1960, first to establish the species and then later to enhance the population. Pine Lake also contains native populations of burbot (*Lota lota*), white sucker (*Catostomus commersoni*), lake chub (*Couesius plumbeus*), fathead minnow (*Pimephales promelas*), Iowa darter (*Percopsis omiscomaycus*) and brook stickleback (*Culaea inconstans*).

During the spring of 1994 Pine Lake was surveyed a number of times to determine the status of the walleye population and identify critical spawning habitats. Incidental data was also collected on the northern pike and yellow perch populations in Pine Lake.

The main walleye spawning area is in the north-east corner of the lake. Spawning may also be occurring in two other areas in the north part of the lake. Northern pike spawning appeared to be centered around the creeks entering the north-west corner of the lake and the east-end of Calhoun Bay. Although the south part of Pine Lake has been previously identified as having a high potential for northern pike spawning, this study did not confirm this. Yellow perch were found to be concentrated in the north end of the lake and spawning is probably similarly concentrated here.

The age-class distribution of the walleye population has shown some improvement

between 1989 and 1994. However, the density of mature walleye in Pine Lake is very low in comparison to other North American lakes. The classification of Pine Lake as having a collapsed walleye population under the new walleye management strategy is appropriate.

Yellow perch and northern pike populations are also showing signs of being under stress, probably because of heavy angling pressure.

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Abstract

Abstract: This study examines the impact of various factors on the growth of the economy. The research is based on a comprehensive analysis of data from 1980 to 2000. The findings indicate that the growth rate of the economy is significantly influenced by the level of investment, the rate of technological innovation, and the quality of the labor force. The study also highlights the importance of maintaining a stable macroeconomic environment to foster sustainable growth. The results suggest that policies aimed at increasing investment, promoting innovation, and improving labor skills are essential for achieving long-term economic growth. The study is divided into several sections, including an introduction, a literature review, a methodology section, a results section, and a conclusion. The introduction provides an overview of the research objectives and the significance of the study. The literature review discusses the existing research on economic growth and identifies the gaps that this study aims to fill. The methodology section describes the data sources and the statistical methods used in the analysis. The results section presents the findings of the study, showing the relationship between the variables of interest. The conclusion summarizes the main findings and offers policy recommendations based on the research results.

1.0 INTRODUCTION

Pine Lake is a small lake with a surface area of 389 ha (elevation 889.34 m) (Mitchell and Prepas 1990) located approximately 35 km south-east of the City of Red Deer. Pine Lake has many campgrounds and cottages surrounding its shoreline and is intensively used by recreationalists, including sport fishermen throughout the year.

Northern pike (*Esox lucius*) and yellow perch (*Perca flavescens*) are the only sport fish species native to Pine Lake. Walleye (*Stizostedion vitreum*) were stocked into Pine Lake many times starting in 1960, first to establish the species and then later to enhance the population. Pine Lake also contains native populations of burbot (*Lota lota*), white sucker (*Catostomus commersoni*), lake chub (*Couesius plumbeus*), fathead minnow (*Pimephales promelas*), Iowa darter (*Percopsis omiscomaycus*) and brook stickleback (*Culaea inconstans*).

During the spring of 1994 Pine Lake was sampled a number of times to determine the status of the walleye population and identify critical spawning habitats. Incidental data was also collected on the northern pike and yellow perch populations in Pine Lake.

2.0 METHODS

The shoreline of Pine Lake was electrofished by boat several times during April and May of 1994 to determine walleye spawning activity. The electrofishing configuration used was a 5.5 m flat-bottom river boat equipped with a boom anode array (36 inch Smith-Root UAA-4 folding umbrella array with 4 stainless steel dropper electrodes on each array), a Coffelt electrofisher (model VVP-15) and an 8000-watt Homelite generator. Continuous (smooth) DC current with an output amperage of 8 to 10 amps at approximately 300 volts was used to capture the fish. The electrofishing was conducted by driving the boat slowly along the shoreline in areas not exceeding 2.5 m in depth. On a map, prior to electrofishing, the shoreline was measured and marked in 0.5 km intervals (Figure 1). The numbers of fish caught or observed were then recorded on a one km or smaller interval.

Fish were also caught in a trap net (152 cm high x 248 cm wide x 465 cm long) that was set in the northeast corner of Pine Lake (km 0.6) from April 28 to May 5, 1994. On the night of May 1, 1994 short duration (< one hour) gill nets (104 mm mesh, 45.7m long, 2.4m deep) were set at six sites to catch fish.

All walleye and a subsample of the yellow perch and northern pike that were caught were anaesthetized using MS222, and then measured for fork length (FL) (nearest 1 mm) and weighed to the nearest gram. Sex and spawning condition were also noted. For ageing purposes, the following were collected: the spine and first two rays of the left pelvic fin from walleye and yellow perch; the first two rays of the left pelvic fin from northern pike. Walleye larger than 200 mm (FL) were tagged with an external anchor (Floy) tag.

A population estimate was calculated separately for mature female and male walleye using

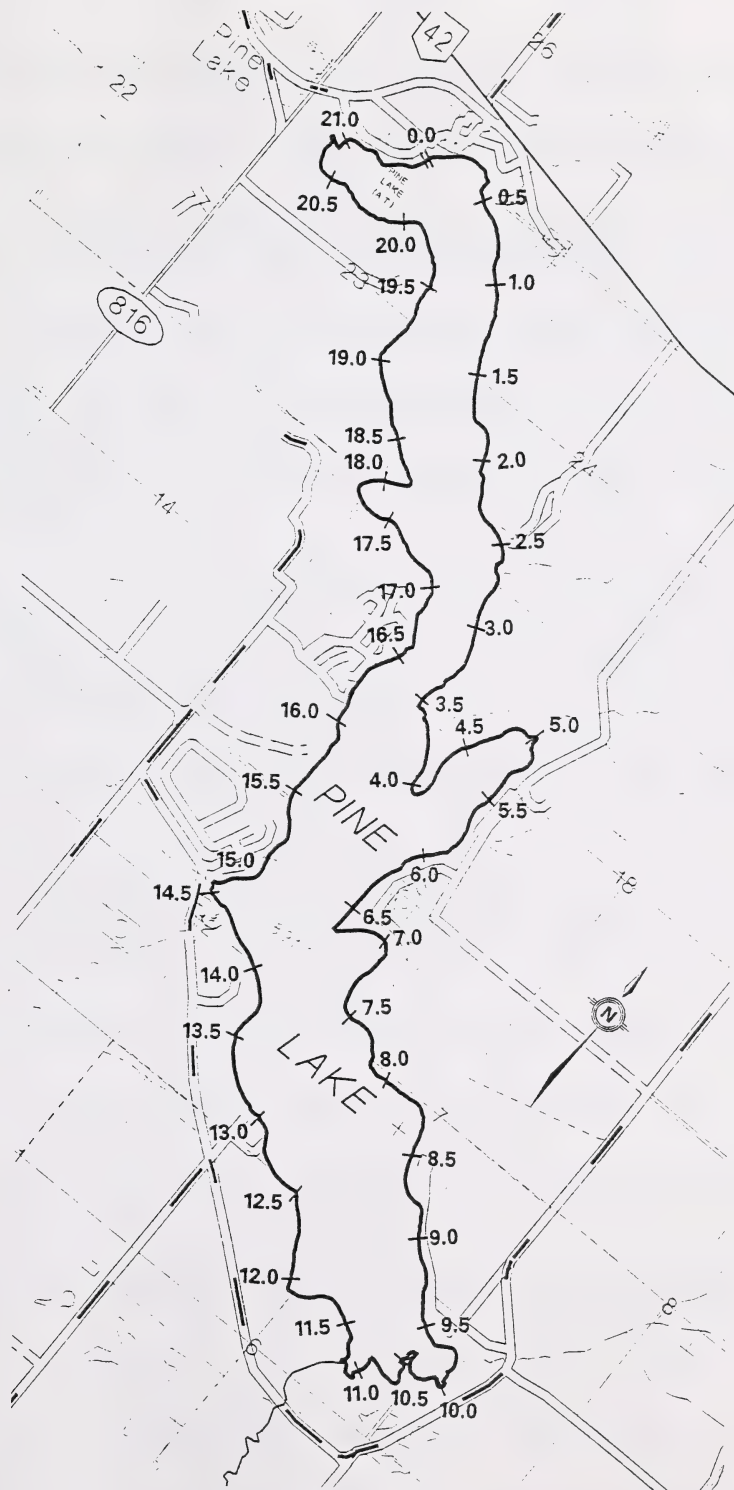


Figure 1. Sampling locations and shoreline kilometers for Pine Lake, spring 1994.

Chapman's modification of Schnabel's method for multiple censuses (Ricker 1975). The 95% confidence interval (CI) for the population estimate was calculated using the number of recaptures as a Poisson variable (Ricker 1975). Population estimates were also calculated using Schumacher and Eschmeyer's estimate, with the 95% CI calculated using equation 3.14 in Ricker (1975).

Water temperatures were recorded hourly from Pine Lake between 11 pm , April 18, 1994 and 10 am, May 10, 1994 using a HoboTemp thermograph. The thermograph was placed 1 m below the water surface at the end of the dock at Scotty's Family Resort (km 14.6, Figure 1).

3.0 RESULTS

3.1 Walleye

Electrofishing was conducted on eight of the 13 nights between April 17 and April 29 (Table 1). No electrofishing was done on the nights of April 24 to April 27 because of a spring snow storm and cooler temperatures. The highest number of walleye caught was 54 during the first evening of electrofishing - April 17 (Table 1). The next highest numbers were 37 walleye on April 22, and 29 walleye on April 18.

The highest catches of walleye (19.8 walleye/km) were from km 0.0 to 1.0, with the catches particularly high from km 0.5 to 1.0 (Table 1). Catches at km 0.5 to 1.0 were highest during the first two nights of electrofishing (April 17 and 18) and then declined. However, even after the catches declined at km 0.5 to 1.0, they remained high in comparison to other parts of the lake.

Another area of high walleye concentration was km 20.0 to 21.0 (Table 1). Most of these fish were caught in the mouth of the creek entering at km 20.8 and in the lake in the immediate vicinity of the creek. The catch here was quite low ($n=1$) when it was first sampled on April 18, but was very high ($n=27$) when it was next sampled on April 22. After April 22, the number of walleye decreased in this area, but remained high in comparison to most parts of the lake. Large numbers of walleye ($n=7$) were also caught from km 5.0 to 6.0 during each of the two nights (April 21 and 29) that it was sampled (Table 1). Most of these walleye were caught in the mouth of a creek entering the lake at km 5.0.

Gill nets were set on the evening of May 1 (Table 2). No walleye were caught at four of the six sampling sites. At one site, three walleye were caught and at the remaining site one

Table 1. The number of walleye caught or observed during electrofishing in Pine Lake, April 1995.

Km	April								Total Effort (km)	Fish/ km fished
	17	18	19	21	22	23	28	29		
0.0-0.5		3							4.5	19.8
0.5-0.7		20	2	9	9	6	1	2		
0.7-1.0	36									
1.0-2.0	13					2	4		3.0	6.3
2.0-3.0	1					1			2.0	1.0
3.0-4.0	3				1				2.0	2.0
4.0-5.0	1			1					2.0	1.0
5.0-6.0				7				7	2.0	7.0
6.0-7.0				0					1.0	0.0
7.0-8.0				1					1.0	1.0
8.0-9.0			0						1.0	0.0
9.0-10.0			1						1.0	1.0
10.0-11.0			0						1.0	0.0
11.0-12.0			0						1.0	0.0
12.0-13.0			0						1.0	0.0
13.0-14.0			0						1.0	0.0
14.0-14.5			0	0				0	2.5	0.0
14.5-15.0			0					0		
15.0-16.0			0						1.0	0.0
16.0-17.0		0							1.0	0.0
17.0-18.0		0							1.0	0.0
18.0-19.0		0							1.0	0.0
19.0-20.0		2							1.0	2.0
20.0-20.5		1			12			4	3.5	13.1
20.5-21.0					15		6	8		
21.0-0.0		3							1.0	3.0
Total	54	29	3	18	37	9	11	21	35.5	5.1

The shaded portions of the table were not sampled.

Table 2. Catch results for gill nets set in Pine Lake, May 1, 1994.

Site (km)	Length of set (minutes)	Depth of set (m)	Number of fish caught		
			Walleye	Northern pike	Yellow perch
0.6	60	1.5-5.2	0	4	0
0.8	55	1.2-1.8	0	6	0
1.3	60	0.9-6.7	3	9	0
4.0	35	1.2-4.6	1	1	0
12.2	45	3.0	0	0	0
14.2	30	1.4	0	2	0
Total			4	22	0

walleye was caught.

A trap net was set off the point of land at km 0.6 from April 28 to May 5 (Table 3). This site was chosen because of the large number of walleye caught during electrofishing along this shoreline (Table 1) and the sharp drop-offs on both sides of the point. In total, eighteen walleye were caught in the trap net; all of the fish were caught between April 28 and May 2 (Table 3). Of the eighteen walleye caught, nine were females: six were in a ripe condition; two were green; one was spent (Table 3). Of the remaining nine walleye, four were ripe males and for five fish the sex could not be determined.

When all of the walleye sampled from the three different capture methods ($n=180$) were combined the majority were males (53.3%) with only 17.8% of the sample identified as female (Table 4). Sex was undetermined for a large portion of the sample (28.8%). Green females were caught between April 17 to May 2. The only ripe females sampled during the study were caught in the trap net between April 29 and May 2. Only four spent females were caught, each being caught on a different night between April 22 and April 30 (no sampling was conducted from April 24 to 27).

Most of the males caught on April 17 (89.9%) and April 18 (94.4%) were in a green state with the remaining males caught in a ripe condition. After April 18 the majority of males caught each night were in a ripe condition. Three spent males were caught during the study, one on April 22 and the others on April 29.

An artificial walleye spawning bed constructed by the Alberta Fish and Game Association in 1989 (Buck for Wildlife project) at km 14.2 was sampled three times by electrofishing and once with a gill net. No walleye were caught or observed at the spawning bed or in the vicinity of it.

Age-length and age-weight data is summarized according to sex in Table 5. The females

Table 3. Catch results for the trap net set in Pine Lake at km 0.6 from April 28 to May 5, 1994.

Date (1994)	Number of fish caught							
	Walleye						Northern pike	Yellow perch
	Green ♀	Ripe ♀	Spent ♀	Ripe ♂	Unknown	Total		
April 28	1	-	-	-	-	1	3	64
April 29	-	2	-	1	1	4	6	386
April 30	-	1	1	2	-	4	6	80
May 1	-	2	-	1	2	5	4	186
May 2	1	1	-	-	2	4	0	53
May 3 ^a	-	-	-	-	-	0	0	0
May 4	-	-	-	-	-	0	0	10
May 5	-	-	-	-	-	0	4	197
Total	2	6	1	4	5	18	23	976

^a the entrance to the trap had collapsed and no fish were caught.

♀-female

♂-male

Table 4. Summary of sexual maturity data according to date for walleye caught (all methods – electrofishing, gill net and trap net) in Pine Lake from April 17 to May 2, 1994.

Date	Female			Male			Sex Unknown
	Green	Ripe	Spent	Green	Ripe	Spent	
April 17	3	-	-	29	4	-	7
April 18	1	-	-	17	1	-	5
April 19	1	-	-	-	1	-	1
April 21	3	-	-	2	6	-	5
April 22	8	-	1	1	11	1	12
April 23	1	-	1	-	6	-	1
April 28	2	-	1	-	2	-	5
April 29	-	2	-	1	8	2	11
April 30	-	1	1	-	2	-	-
May 1	2	2	-	-	2	-	3
May 2	1	1	-	-	-	-	2
Total	22	6	4	50	43	3	52

Table 5. Age-length and age-weight data according to sex for walleye from Pine Lake, April and May, 1994.

Age Class	Year Class	n	Fork length (mm)			Weight (g)		
			Mean	Range	SD	Mean	Range	SD
FEMALES								
4	1990	1	411.0	-	-	855	-	-
5	1989	7	442.0	417-471	15.1	1064	820-1390	181.7
6	1988	11	473.5	434-510	22.0	1230	870-1465	166.0
7	1987	5	489.6	443-528	28.2	1330	1000-1475	177.3
10	1984	1	591.0	-	-	2485	-	-
11	1983	1	636.0	-	-	2745	-	-
12	1982	1	598.0	-	-	2290	-	-
16	1978	1	615.0	-	-	2905	-	-
Combined		28	485.8	411-636	58.1	1389	820-2905	539.9
MALES								
3	1991	2	358.5	350-367	8.5	438	410-465	27.5
5	1989	35	403.5	346-440	17.0	687	545-960	87.0
6	1988	22	433.2	378-495	29.4	864	590-1295	166.4
7	1987	14	451.5	409-498	22.9	1003	780-1245	128.0
9	1985	3	507.0	489-538	22.0	1438	1255-1725	205.3
10	1984	1	488.0	-	-	1330	-	-
11	1983	2	494.0	481-507	13.0	1353	1255-1450	97.5
12	1982	2	509.0	491-527	18.0	1520	1450-1590	70.0
13	1981	1	530.0	-	-	1540	-	-
14	1980	3	533.7	508-552	18.7	1555	1415-1715	123.3
15	1979	2	561.5	549-574	12.5	1875	1775-1975	100.0
16	1978	1	582.0	-	-	1915	-	-
Combined		88	438.0	346-582	49.8	923	410-1975	342.7
SEX UNKNOWN								
3	1991	14	335.7	316-363	12.9	400	310-495	46.7
4	1990	6	361.7	294-442	50.5	522	310-905	211.9
5	1989	16	421.6	397-457	18.2	810	590-1130	130.1
6	1988	9	453.8	413-505	25.1	1047	800-1350	168.8
7	1987	5	463.0	390-515	45.1	1114	670-1460	310.0
Combined		50	400.3	294-515	56.4	734	310-1460	310.8

sampled ranged in age from 4 to 16 years olds; however, age-classes 8, 9, 13, 14 and 15 were missing. The females ranged in size from 411 to 636 mm FL and 820 to 2905 g in weight. The males sampled ranged in age from 3 to 16, with only age-classes 4 and 8 missing. The males ranged in size from 346 to 582 mm FL and 410 to 1975 g in weight. The sex of fifty of the walleye sampled could not be determined. These fish were all between 3 and 7 years of age and ranged between 294 to 515 mm FL and 310 to 1460 g in weight. Many of these fish because of their young age and smaller size are probably immature fish.

The age-class distribution of the walleye sampled in 1994 and 1989 is depicted in Figure 2. The 1994 sample shows a wide range of age-classes present from 3 to 16 years old, with no 8 year old fish and most of the sample being 3 to 7 years old.

During the study, 11 of the tagged walleye were recaptured (Table 6). One of the walleye (tag #A188) was recaptured twice. Eight of the fish recaptures were captured by electrofishing for both the initial tagging and recapture. Three of the recaptured walleye were caught in the trap net and then recaptured in the trap net the following night. All of the recaptures from the trap net were female walleye; two of the fish were ripe both times they were caught and the other fish was ripe when initially caught, but was spent the following night when it was recaptured. All of the recaptured walleye were caught within either the original kilometer where they were tagged or in the adjacent kilometer.

Anglers later recaptured 12 different walleye (Table 7). One of the walleye (tag # A271) was tagged on April 22, 1994, it was caught and released by an angler 87 days later on July 18, 1994 and was then caught and released by a different angler over four years later on July 23, 1998. Another walleye (tag # A167) was also caught and released twice by anglers. It was tagged on April 17, 1994, caught 55 days later on June 11, 1994 and then caught over a year later

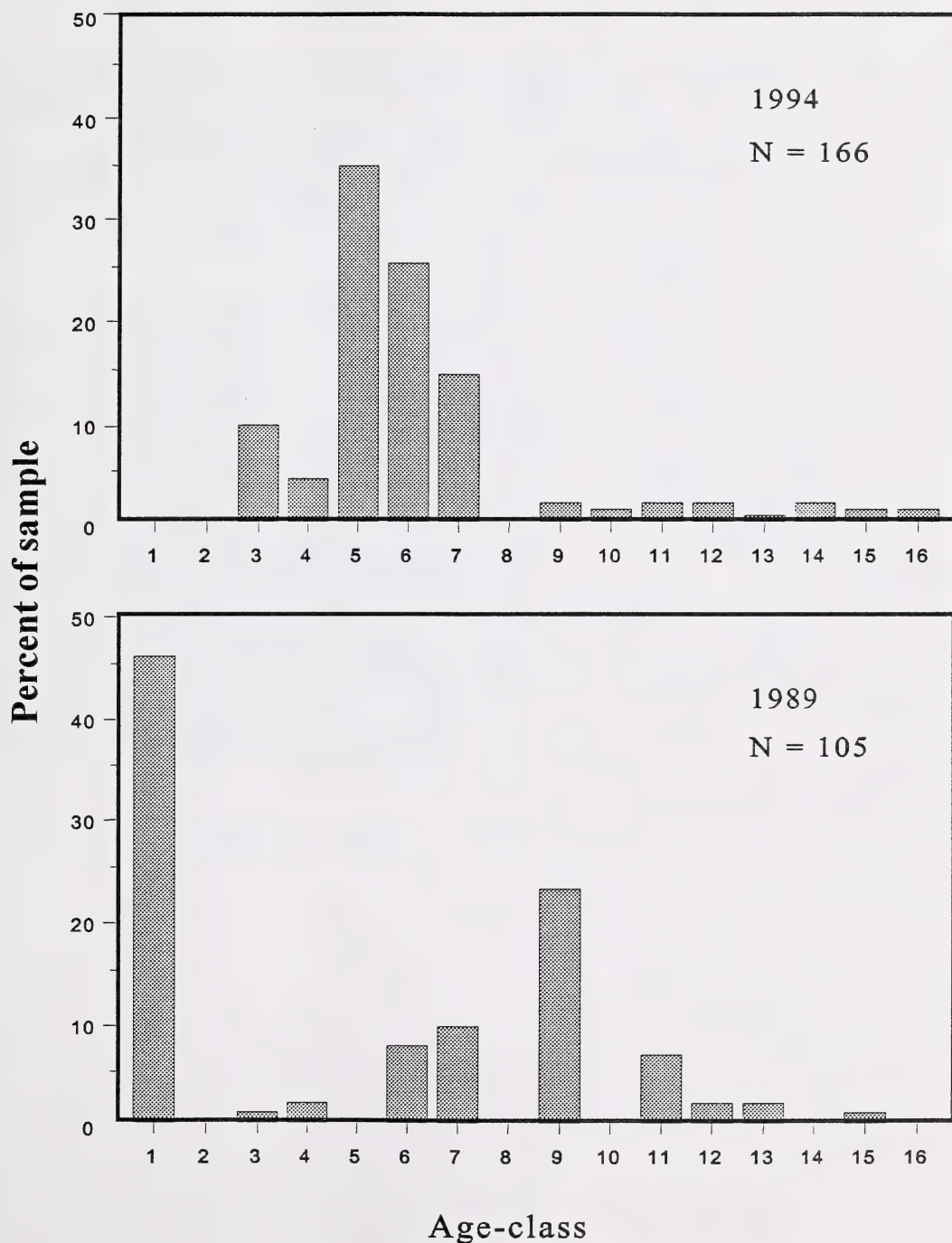


Figure 2. Age-class distribution of walleye sampled from Pine Lake in 1989 (gill nets, Buchwald 1991) and 1994 (electrofishing, gill nets, trap nets).

Table 6. Tagged walleye recaptures during study, Pine Lake, spring 1994.

Tag #	Date (1994)		# of days between captures	Location (km)		Sexual Maturity ^a		Capture Method ^b
	Tagged	Recap		Tagged	Recap	Tagged	Recap	
A157	April 17	April 18	1	2.0-1.0	0.7-0.5	Green ♂	Green ♂	EL
A165	April 17	April 21	4	2.0-1.0	1.0-0.5	Green ♂	Ripe ♂	EL
A168	April 17	April 19	2	3.0-2.0	1.0-0.5	Green ♂	Ripe ♂	EL
A188	April 17	April 22	5	1.0-0.7	1.0-0.5	Green ♂	Green ♂	EL
	April 22	April 23	1	1.0-0.5	1.0-0.5	Green ♂	Ripe ♂	EL
A190	April 17	April 22	5	1.0-0.7	1.0-0.5	Green ♂	Ripe ♂	EL
A208	April 18	April 22	4	0.7-0.5	1.0-0.5	Ripe ♂	Ripe ♂	EL
A223	April 18	April 22	4	0.0-21.0	21.0-20.5	Green ♀	Green ♀	EL
A251	April 22	April 29	7	21.0-20.5	21.0-20.5	Ripe ♂	Spent ♂	EL
A290	April 29	April 30	1	0.6	0.6	Ripe ♀	Spent ♀	TN
A292	April 29	April 30	1	0.6	0.6	Ripe ♀	Ripe ♀	TN
A306	May 1	May 2	1	0.6	0.6	Ripe ♀	Ripe ♀	TN

^a ♂-male; ♀-female

^b EL-electrofishing; TN-trap net

Table 7. Tagged walleye caught by anglers in Pine Lake, 1994 and 1995.

Tag #	Date		Fish kept or released	# of days between captures	Location (km)	
	Tagged (1994)	Recap			Tagged	Recap
A155	April 17	July 27, 1994	kept	101	2.0-1.0	≈ 17.0
A167	April 17	June 11, 1994	released	55	2.0-1.0	≈ 17.0
		August 5, 1995	released	475	2.0-1.0	≈ 3.5
A194	April 17	June 28, 1997	released	934	1.0-0.7	-
A196	April 17	August 29, 1997	released	996	1.0-0.7	-
A206	April 18	August 8, 1997	released	1212	0.7-0.5	-
A237	April 21	July 23, 1995	released	458	6.0-5.0	-
A252	April 22	August 17, 1995	kept	482	21.0-20.5	-
A253	April 22	August 17, 1995	kept	482	21.0-20.5	-
A271	April 22	July 18, 1994	released	87	1.0-0.5	-
		July 23, 1998	released	1561	1.0-0.5	-
A273	April 23	September 5, 1994	kept	135	3.0-2.0	-
A278	April 23	June 26, 1995	released	429	1.0-0.5	9.0-10.0
A287	April 28	July 18, 1994	kept	81	21.0-20.5	4.0-6.0

on August 5, 1995.

The population estimates for mature walleye in Pine Lake are summarized in Table 8. Depending on the capture method and the estimator used, the population estimate for mature male walleye ranged from 348 to 508 fish. An estimate for mature female walleye caught by electrofishing could not be calculated because there was only one recapture (Table 6). The estimates for mature female walleye caught by all methods ranged from 83 to 95 fish. For both sexes the Schumacher-Eschmeyer estimates were higher and their 95% CI were much larger than for the Schnabel estimates. Using the Schnabel estimator for all capture methods combined, the density of mature male and female walleye is 1.3 walleye/ha (Table 8).

3.2 Northern Pike

The numbers of northern pike enumerated per kilometer of electrofishing were highest at km 20.0-21.0 (42.6 fish/km), km 5.0-6.0 (26.0), and km 0.0-1.0 (17.6) (Table 9). Most of the northern pike counted in km 20.0-21.0 and km 5.0-6.0 were caught in the creeks entering at km 20.8 and km 5.0, or in the lake directly adjacent to the creeks. The high numbers of northern pike in km 20.0-21.0 were due to the enumeration of 92 fish on the night of April 18 in km 20.0-21.0 and the capture of 32 northern pike on April 28 in km 20.5-21.0 (Table 9). No northern pike were seen between km 11.0 and 14.0. Northern pike were the most numerous species caught in the gill nets set on the evening of May 1 and were the most abundant at the km 1.3 site (Table 2). Twenty-three northern pike were caught in the trap net from April 28 to May 5 (Table 3).

Age-length and age-weight data is summarized in Table 10. The female and male northern pike sampled ranged from three to seven years old, with no missing age-classes. The sex of 28 northern pike ranging between one and three years of age could not be determined.

Table 8. Population estimates for mature walleye in Pine Lake, spring 1994.

Capture Method	Estimator	Population Estimate	95% CI	Density (walleye/ha)
MALES				
Electrofishing	Schumacher-Eschmeyer	404	219-2625	1.0
	Schnabel	348	198-920	0.9
All methods ^a	Schumacher-Eschmeyer	508	285-2380	1.3
	Schnabel	417	238-1105	1.1
FEMALES				
All methods ^a	Schumacher-Eschmeyer	95	48-2545	0.2
	Schnabel	83	41-414	0.2

^a includes fish caught by electrofishing, gill netting and trap nets.

Table 9. The number of northern pike caught or observed during electrofishing in Pine Lake, April 1994.

Km	April								Total Effort (km)	Fish/ km fished
	17	18	19	21	22	23	28	29		
0.0-0.5		32							4.5	17.6
0.5-0.7		1					15			
0.7-1.0	4		3	5	5	2		12		
1.0-2.0	1					1	12		3.0	4.7
2.0-3.0	3					2			2.0	2.5
3.0-4.0	6				3				2.0	4.5
4.0-5.0	0			10					2.0	5.0
5.0-6.0				26				26	2.0	26.0
6.0-7.0				7					1.0	7.0
7.0-8.0				8					1.0	8.0
8.0-9.0			10						1.0	10.0
9.0-10.0			3						1.0	3.0
10.0-11.0			9						1.0	9.0
11.0-12.0			0						1.0	0.0
12.0-13.0			0						1.0	0.0
13.0-14.0			0						1.0	0.0
14.0-14.5				2					2.5	2.8
14.5-15.0			1					4		
15.0-16.0			2						1.0	2.0
16.0-17.0		2							1.0	2.0
17.0-18.0		0							1.0	0.0
18.0-19.0		6							1.0	6.0
19.0-20.0		2							1.0	2.0
20.0-20.5					42			15	3.5	42.6
20.5-21.0		10			50		32	0		
21.0-0.0		11							1.0	11.0
Total	14	64	28	58	100	5	59	57	35.5	10.8

The shaded areas of the table were not sampled.

Table 10. Age-length and age-weight data according to sex for northern pike from Pine Lake, April and May, 1994.

Age Class	Year Class	n	Fork length (mm)			Weight (g)		
			Mean	Range	SD	Mean	Range	SD
FEMALES								
3	1991	2	421.0	417-425	4.0	570	565-575	5.0
4	1990	2	507.5	453-562	54.5	988	810-1165	177.5
5	1989	9	555.3	532-586	93.4	1290	945-1510	163.4
6	1988	10	611.0	565-676	38.4	1625	1175-2120	317.7
7	1987	1	675.0	-	-	2220	-	-
Combined		24	568.3	417-676	68.1	1383	565-2220	432.9
MALES								
3	1991	8	428.5	384-454	19.3	589	465-705	68.8
4	1990	3	497.3	481-521	17.1	875	745-980	97.6
5	1989	10	521.8	483-550	20.7	1008	770-1225	126.5
6	1988	8	573.1	530-604	21.4	1256	1035-1575	159.4
7	1987	2	597.0	588-606	9.0	1565	1485-1645	80.0
Combined		31	513.5	384-606	61.5	987	465-1645	316.1
SEX UNKNOWN								
1	1993	4	209.5	190-234	15.8	60	35-90	20.3
2	1992	2	264.0	193-335	71.0	175	55-295	120.0
3	1991	5	386.6	347-441	31.8	454	335-665	122.0
4	1990	2	487.0	475-499	12.0	788	780-795	7.5
5	1989	6	543.3	511-562	16.9	1113	905-1235	108.9
6	1988	6	636.3	594-661	20.8	1568	1185-1875	216.9
7	1987	2	701.0	673-729	28.0	2620	2435-2805	185.0
8	1986	1	764.0	-	-	2800	-	-
Combined		28	482.8	190-764	172.2	1020	35-2805	805.0

The age-class distribution of all the northern pike sampled is shown in Figure 3. Age-classes one to eight were present in the sample. Age-classes five, six and three were the most abundant, with age-classes two and eight the least abundant.

One ripe female northern pike was caught when the project commenced on April 17 and the only other ripe female was caught on May 1 (Table 11). Ripe males were also caught starting on April 17, with the last ripe male being caught on May 1. Spent female and male northern pike were first caught starting on April 21.

3.3 Yellow Perch

The highest numbers of yellow perch caught and observed during the electrofishing were at km 21.0-0.0 (56 fish/km), km 0.0-1.0 (28.0), and km 20.0-21.0 (20.6) (Table 12). These sampling areas are contiguous and the high numbers are mainly due to the large numbers caught at the start of the sampling on April 17 and April 18. No yellow perch were found at km 2.0-4.0, km 7.0-10.0, and km 18.0-20.0. No yellow perch were caught in the gill nets set on May 1 (Table 2). Yellow perch were the most abundant species caught in the trap net set at km 0.6, with a total of 976 being caught. The highest catch in the trap net for yellow perch was on April 29th when 386 were caught.

Age-length and age-weight data is summarized in Table 13. Males dominated the sample with 79 individuals; only 13 females and 22 fish whose sex could not be determined were sampled. The females sampled ranged in size from 171 to 291 mm FL. The age-classes of the females sampled ranged from five to 11; however, age-classes eight and nine were missing. The males sampled ranged in size from 81 to 232 mm FL. The age-classes of males ranged from two

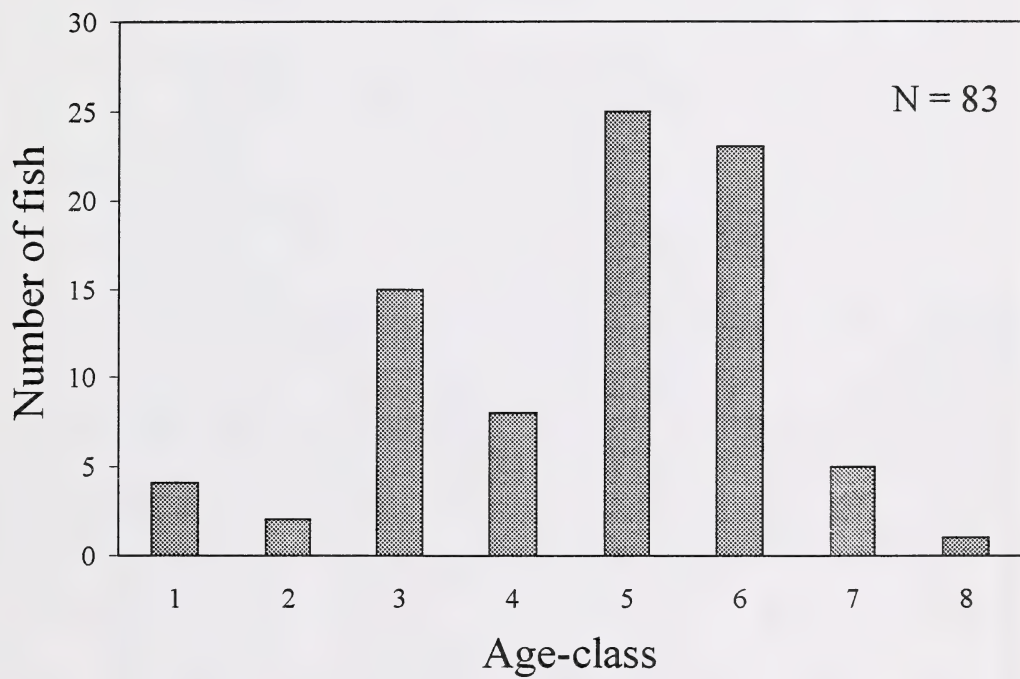


Figure 3. Age-class distribution of northern pike sampled from Pine Lake, spring 1994.

Table 11. Summary of sexual maturity data according to date for northern pike caught in Pine Lake from April 17 to May 5, 1994.

Date	Female			Male			Sex Unknown
	Green	Ripe	Spent	Green	Ripe	Spent	
April 17	1	1	-	4	1	-	1
April 18	2	-	-	2	1	-	3
April 19	1	-	-	-	-	-	-
April 21	4	-	5	1	-	1	2
April 22	4	-	2	-	2	1	3
April 27	-	-	-	-	-	-	1
April 28	-	-	1	1	-	6	3
April 29	-	-	-	-	2	-	4
April 30	-	-	1	-	-	1	-
May 1	-	1	-	-	2	3	5
May 2	-	-	-	-	-	3	5
May 4	-	-	-	-	-	-	1
May 5	-	-	1	-	-	-	-
Total	12	2	10	8	8	15	28

Table 12. The number of yellow perch caught or observed during electrofishing in Pine Lake, April 1994.

Km	April								Total Effort (km)	Fish/ km fished
	17	18	19	21	22	23	28	29		
0.0-0.5		46					7		4.5	28.0
0.5-0.7		10	5	0	5	1		2		
0.7-1.0	>50									
1.0-2.0	0					1	4		3.0	1.7
2.0-3.0	0					0			2.0	0.0
3.0-4.0	0				4				2.0	2.0
4.0-5.0	0			5					2.0	2.5
5.0-6.0				9				6	2.0	7.5
6.0-7.0				1					1.0	1.0
7.0-8.0				0					1.0	0.0
8.0-9.0			0						1.0	0.0
9.0-10.0			3						1.0	3.0
10.0-11.0			7						1.0	7.0
11.0-12.0			1						1.0	1.0
12.0-13.0			2						1.0	2.0
13.0-14.0			3						1.0	3.0
14.0-14.5			0	2				1	2.5	1.2
14.5-15.0			0							
15.0-16.0			0						1.0	0.0
16.0-17.0		2							1.0	2.0
17.0-18.0		6							1.0	6.0
18.0-19.0		0							1.0	0.0
19.0-20.0		0							1.0	0.0
20.0-20.5		43			4			3	3.5	20.6
20.5-21.0					11		11	0		
21.0-0.0		56							1.0	56.0
Total	50	163	21	17	24	2	22	12	35.5	8.8

The shaded portions of the table were not sampled.

Table 13. Age-length and age-weight data according to sex for yellow perch from Pine Lake, April and May, 1994.

Age Class	Year Class	n	Fork length (mm)			Weight (g)		
			Mean	Range	SD	Mean	Range	SD
FEMALES								
5	1989	6	190.5	171-202	11.9	102	70-130	22.9
6	1988	3	204.0	198-213	6.5	140	115-165	20.4
7	1987	2	242.5	221-264	21.5	208	155-260	52.5
10	1984	1	291.0	-	-	340	-	-
11	1983	1	285.0	-	-	415	-	-
Combined		13	216.6	171-291	38.9	169	70-415	105.2
MALES								
2	1992	1	81.0	-	-	5	-	-
3	1991	18	107.8	98-116	4.5	15	10-25	3.9
4	1990	28	150.0	135-168	8.4	41	30-50	5.8
5	1989	20	175.2	157-188	8.5	71	50-95	10.8
6	1988	6	201.5	185-220	12.9	119	85-165	25.1
7	1987	4	216.3	208-223	6.1	145	130-150	8.7
10	1984	2	227.5	223-232	4.5	180	175-185	5.0
Combined		79	155.1	81-232	35.4	57	5-185	42.0
SEX UNKNOWN								
2	1992	1	97.0	-	-	5	-	-
3	1991	5	122.6	114-134	7.5	21	10-30	6.6
4	1990	4	144.3	142-146	1.5	39	35-45	4.1
5	1989	4	188.3	172-213	15.9	104	60-175	47.9
6	1988	4	202.5	182-233	20.4	131	85-205	46.3
7	1987	4	236.0	217-250	13.4	240	190-295	45.7
Combined		22	172.5	97-250	44.6	98	5-295	88.0

to 10 years; however, as with the females age-classes eight and nine were missing. Figure 4 shows the combined age-class distribution for all yellow perch sampled. Age-classes three, four, and five are the most abundant, with age-classes eight and nine absent.

Ripe males were caught starting the first day yellow perch were sampled (April 18), and were present every day yellow perch were caught except for the last day, May 5 (Table 14). Only two ripe female walleye were caught; they were caught on April 30 and May 2. Spent females were caught starting April 22 and spent males starting on April 27 (no sampling of yellow perch was done from April 23 to April 26).

3.4 Water Temperature

Figure 5 shows the daily mean, minimum, and maximum water temperature for Pine Lake from April 19 to May 9, 1994.

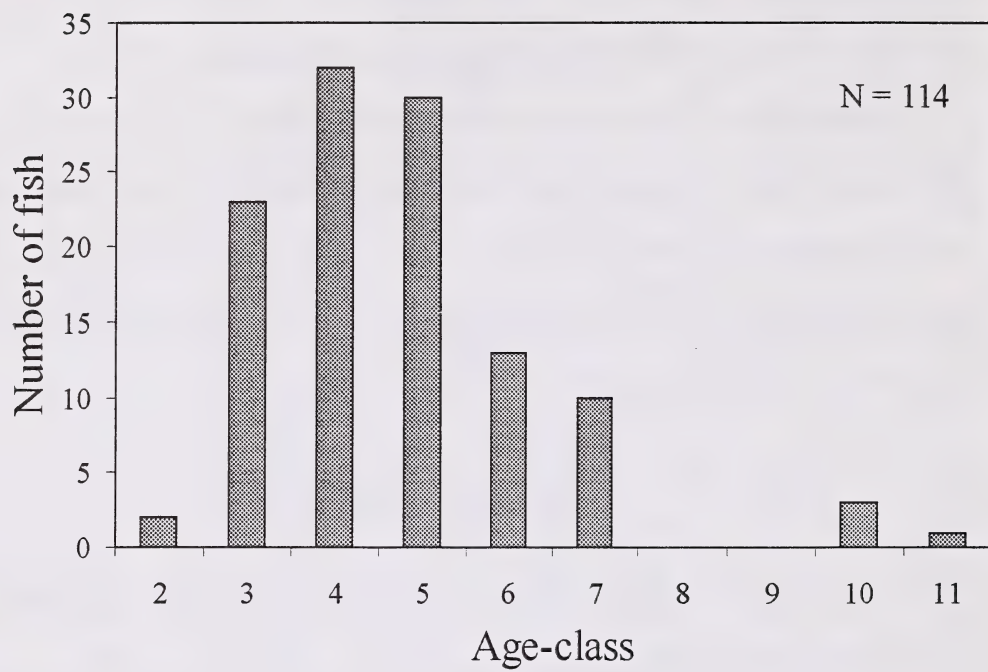


Figure 4. Age-class distribution of yellow perch sampled from Pine Lake, spring 1994.

Table 14. Summary of sexual maturity data according to date for yellow perch caught in Pine Lake from April 18 to May 5, 1994.

Date	Female			Male			Sex Unknown
	Green	Ripe	Spent	Green	Ripe	Spent	
April 18	-	-	-	4	5	-	7
April 19	1	-	-	-	1	-	1
April 22	3	-	1	-	3	-	2
April 27	-	-	-	1	7	1	2
April 28	-	-	1	-	15	-	-
April 29	-	-	-	-	10	-	-
April 30	1	1	1	-	6	-	1
May 1	-	-	1	-	1	2	6
May 2	-	1	-	-	1	7	1
May 4	-	-	2	-	1	6	2
May 5	-	-	-	-	-	8	-
Total	5	2	6	5	50	24	22

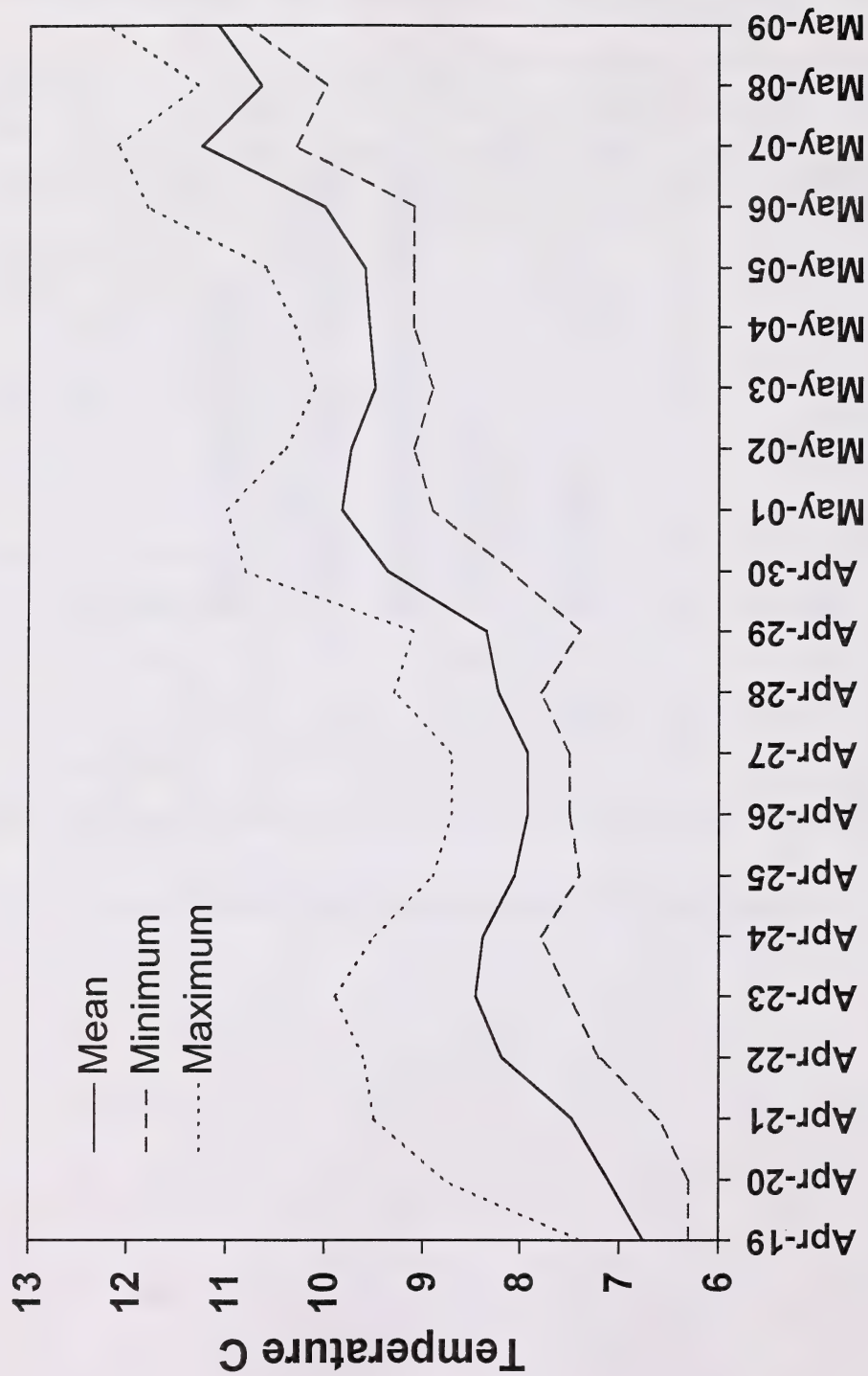


Figure 5. Daily mean, minimum, and maximum water temperature for Pine Lake from April 19 to May 9, 1994.

4.0 DISCUSSION

4.1 Walleye

The high concentrations of walleye caught electrofishing from km 0.0 to 2.0 suggests that this part of Pine Lake's shoreline is a major spawning area. Within this area, spawning appears to be concentrated in km 0.5 to 1.0 since the numbers of walleye were particularly high there (Table 1). The capture of ripe female walleye in the trap net at km 0.6, on consecutive nights (Table 6), also indicates that walleye are spawning in this part of the lake. In this location, the shoreline is rocky and the bottom substrate is gravel and cobble. A shoreline habitat assessment of Pine Lake in 1992 identified this area as one of four potential walleye spawning areas (Jacobson and Ellis 1993). Another potential area identified by Jacobson and Ellis (1993) was between km 2.0 and 2.5. Although walleye abundance was not high in this area, the one spent female may indicate a low level of spawning activity.

The two other areas of high walleye concentrations were at km 20.0 to 21.0 and km 5.0 to 6.0, neither of which were identified as potential walleye spawning areas in Jacobson and Ellis (1993). Both of these areas; however, have small creeks flowing into them (km 20.8 and km 5.0), with most of the walleye caught either in the creeks or in the lake closely adjacent to the creeks. The creek at km 5.0 is actually more of a low lying seepage area with a channel going back only for about 200 meters from the lake. The bottom substrate is silt and organic detritus, and has no walleye spawning potential. The creek at km 20.8 is a proper creek, but appears to have no spawning potential since the bottom substrate between Pine Lake and Highway 42 is entirely silt. The walleye may be attracted to creeks at km 5.0 and 20.8 because of their different water chemistry, warmer water temperatures or to feed.

There are some rocky substrates in Pine Lake between km 19.5 and 20.2 that might be suitable spawning substrate. Although Jacobson and Ellis (1993) did not identify this area as rocky, their sampling transects may have missed the rocky substrate since it is only found in small patches. The large number of female walleye caught during the study at km 20.0 to 21.0 suggests that there may be some spawning activity in this part of the lake; however, all the females caught were either green or spent, no ripe females were caught.

The presence of males that were mostly in a green state on April 17 and 18 and the appearance of the first spent female and spent male walleye on April 22 suggests that spawning commenced between April 19 and April 21. The water temperatures between April 19 and April 21 ranged from a daily minimum of 6.3 to 6.6°C and a daily maximum of 7.4 to 9.5°C (Figure 5). These temperatures are within the ranges reported by Scott and Crossman (1973) who stated that for walleye, spawning normally begins at water temperatures of 6.7 to 8.9°C, but has been known to occur over a range of 5.6 to 11.1°C. Spawning continued until at least May 2 when the last walleye, a ripe female, was caught.

The age-class distribution of the walleye sampled during this study (1994) is markedly different from those sampled in 1989 (Figure 2). The large number of yearling fish in the 1989 sample was probably due to the stocking of 115,000 fingerling walleye in 1988 (Buchwald 1991). Ignoring the yearling fish from 1989, differences between the two sample years are still apparent; the 1994 sample has a much broader distribution and is only missing one age-class (six year olds). Some of the differences between the two years may be due to differences in sampling methods and times: the 1989 sampling was done with gillnets in June, whereas the 1994 sampling was done mainly by electrofishing in April and May. The changes in the age-class distribution suggest that walleye recruitment has become more stable and the status of the population might be slowly

improving.

In February 1989, a Buck for Wildlife project to enhance walleye spawning in Pine Lake was done by constructing a spawning bed of cobble at km 14.2. During this study this spawning bed was sampled three times by electrofishing and once with a gill net. No walleye were ever caught or observed at the spawning bed or in the vicinity of it.

The density of mature walleye in Pine Lake is low in comparison to other lakes in North America (Table 15 and Figure 6). The density of walleye in Pine Lake is similar to several lakes in Alberta such as Wolf, Sylvan and Touchwood. These lakes were all classed as having collapsed walleye populations under the new walleye management strategy implemented in Alberta in April of 1996 (Berry 1995).

4.2 Northern Pike

Most of the northern pike counted in km 5.0-6.0 and km 20.0-21.0 were actually enumerated in the creeks entering the lake at km 5.0 and km 20.8, or in the lake directly adjacent to the creeks. Jacobsen and Ellis (1993) identified these two inlet creeks plus the south shoreline from km 9.7 to 11.8, including the outlet at km 11.2 and the inlet at km 9.7, as probable northern pike spawning habitat. During this study, the catches of northern pike were low to moderate in the south part of the lake. One reason might be that in the south part of the lake we were often electrofishing a long distance from the shore because of the extensive bulrush (*Scirpus* sp.) and cattail (*Typha* sp.) beds that extend far out into the lake. Many of the spawning northern pike were likely closer to shore or in the bulrush and cattail beds where we did not sample.

The presence of a ripe female on April 17, the first night of sampling, indicates that spawning had started on or before that date. The initial thermograph reading on April 19

Table 15. Estimates of mature walleye population densities in North American water bodies.

Lake	Reference	Area (ha)	Density (walleye/ha)
Pine Lake, Alberta	this study	389	1.5
Pigeon Lake, Alberta	Boag & Jacobsen (1993)	9670	0.1
Sylvan Lake, Alberta	Pattenden (1994)	4280	1.2
Pinehurst Lake, Alberta	Sullivan (1993a)	4070	4.4
Touchwood Lake, Alberta	Sullivan (1992a)	2900	1.4
Wolf Lake (1992), Alberta	Sullivan (1992b)	3150	1.1
Wolf Lake (1983), Alberta	1983 (unpubl. data) (found in Sullivan 1992b)	3150	2.0
Seibert Lake, Alberta	Sullivan (1993b)	3790	3.1
Henderson Lake, Ontario	Reid (1984)	150	8.9
Clear Lake, Iowa	Carlander & Payne (1977)	1474	9.9 (range 4.5-20.9)
Escanaba Lake, Wisconsin	Kempinger & Carline (1977)	119	34.0 (range 13-52)
Savanne Lake, Ontario	Baccante & Reid (1988)	364	15.4
Dexter Lake, Ontario	Moenig (1975)	369	10.8
Hoover Reservoir, Ohio	Erickson (1970)	1336	7.3-31.6
Oneida Lake, New York	Forney (1976)	20700	>25
Wilson Lake, Wisconsin	Johnson (1977)	245	27.0 (range 14-37)
Big Crooked Lake, Wisconsin	Serns (1978)	276	14.8 (range 7.8-23.8)

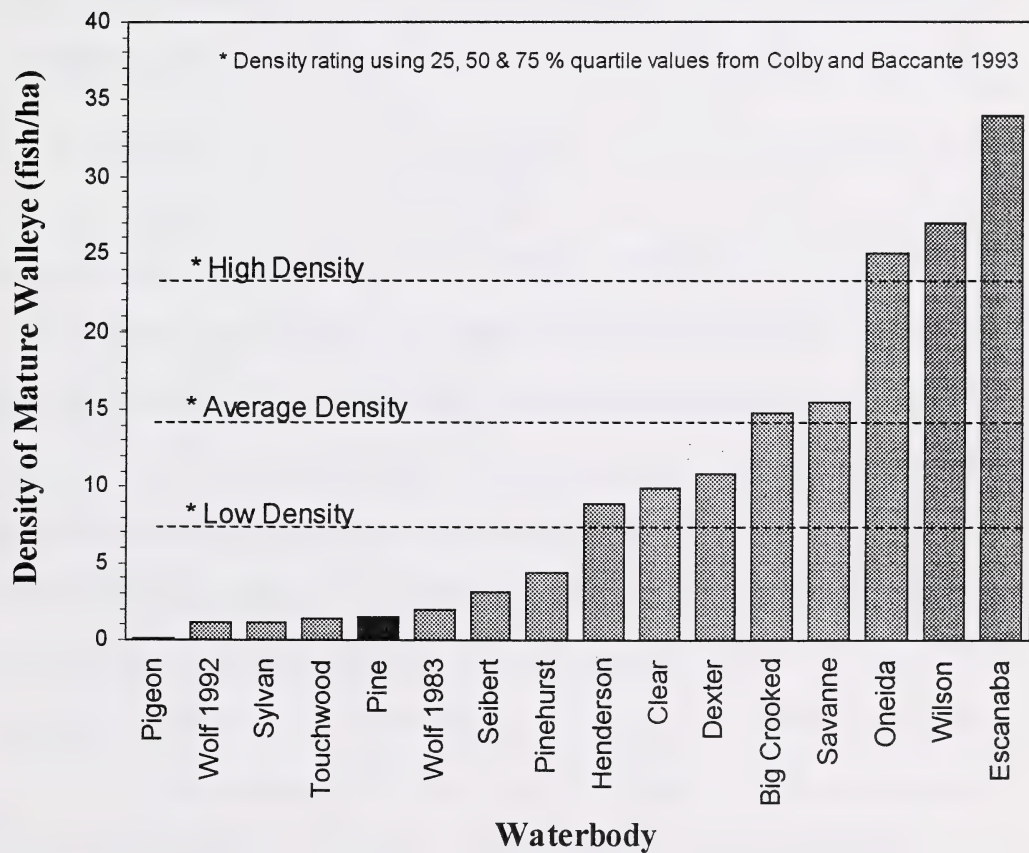


Figure 6. Estimates of mature walleye densities in water bodies in North America.

recorded a temperature range of 6.3 to 7.4°C (Figure 5), which is within the spawning temperature of 4.4 to 11.1°C reported by Scott and Crossman (1973) for northern pike.

The absence of northern pike older than eight years and the presence of only a few seven and eight year old fish in the sample suggest that the population is heavily exploited. Pine Lake because of its small size and heavy use is very susceptible to heavy sport fishing pressure.

4.3 Yellow Perch

The high electrofishing catches of yellow perch in the three contiguous kilometers (km 1.0 to km 20.0) at the north part of the lake suggest that this is a major spawning area. The trap net that was set at km 0.6 confirmed that large numbers of yellow perch were in the north end of the lake.

No yellow perch were sampled before April 22, but the capture of a spent female yellow perch on April 22 indicates that spawning had commenced prior to this date. Scott and Crossman (1973) report that yellow perch spawn at water temperatures of between 8.9 and 12.2°C. The daily maximum water temperature in Pine Lake first reached 8.9°C on April 20 (Figure 5). Spawning continued until at least May 2, when the last ripe female was caught.

The dominance of the age-class distribution by young yellow perch ages three, four, and five, plus the absence of some age-classes, suggest that the population is heavily exploited. Recruitment appears to be good with the abundance of the younger age-classes.

5.0 CONCLUSIONS

The main walleye spawning area is in the north-east corner of the lake (km 0.0 to km 2.0). Spawning may also be occurring in two other areas in the north part of the lake (km 2.0 to 2.5, and km 19.5 to 20.2). Northern pike spawning appeared to be centered around the two creeks entering Pine Lake at km 20.8 and km 5.0. Although the south part of Pine Lake has been previously identified as having a high potential for northern pike spawning, this study did not confirm this. However, this may be due to sampling limitations. Yellow perch were found to be concentrated in the north end of the lake and spawning is probably similarly concentrated there.

The age-class distribution of the walleye population has shown some improvement between 1989 and 1994. However, the density of mature walleye in Pine Lake is very low in comparison to other North American lakes. The classification of Pine Lake as having a collapsed walleye population under the new walleye management strategy is appropriate.

Yellow perch and northern pike populations are also showing signs of being under stress, probably because of heavy angling pressure.

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Appendix I. Number of fish caught or observed according to date and location, April 17 to May 5, 1994.

Date	Km	Walleye		Northern pike	Yellow Perch
		caught	observed	observed	observed
April 17	4.5-5.0	0	0	0	0
	4.0-4.5	1	0	0	0
	4.0-3.5	0	0	0	0
	3.5-3.0	3	0	1	0
	2.0-3.0	1	0	1	0
	1.0-2.0	12	1	1	0
	0.7-1.0	26	10	2	numerous
April 18	0.7-0.5	18	2	0	3
	0.5-0.0	3	0	25	37
	0.0-21.0	3	0	11	56
	21.0-20.0	0	1	10	43
	20.0-19.0	0	2	2	0
	19.0-18.0	0	0	6	0
	18.0-17.0	0	0	0	6
	17.0-16.0	0	0	2	2
April 19	16.0-15.0	0	0	2	0
	15.0-14.0	0	0	1	0
	14.0-13.0	0	0	0	3
	13.0-12.0	0	0	0	2
	12.0-11.0	0	0	0	1
	11.0-10.0	0	0	9	7
	10.0-9.0	1	0	2	0
	9.0-8.0	0	0	10	0
	1.0-0.5	2	0	3	5
April 21	1.0-0.5	7	2	1	0
	8.0-7.0	1	0	8	0
	7.0-6.0	0	0	7	1
	6.0-5.0	7	0	17	9
	5.0-4.0	1	0	10	5

	14.5-14.0	0	0	2	2
April 22	4.0-3.0	1	0	2	0
	21.0-20.5	15	0	45	10
	20.5-20.0	9	3	42	3
	1.0-0.5	9	0	8	2
April 23	3.0-2.0	1	0	1	0
	2.0-1.0	2	0	0	1
	1.0-0.5	6	0	2	1
April 28	TN	1	0	3	64
	2.0-1.0	4	0	5	4
	1.0-0.0	1	0	15	7
	21.0-20.5	4	2	32	11
April 29	TN	4	0	6	386
	15.0-14.0	0	0	4	1
	6.0-5.0	6	1	26	6
	21.0-20.5	8	0	0	0
	20.5-20.0	4	0	15	3
	1.0-0.5	2	0	12	2
April 30	TN	4	0	6	80
May 1	TN	5	0	4	186
	GN-0.6	0	0	4	0
	GN-0.8	0	0	6	0
	GN-1.3	3	0	9	0
	GN-4.0	1	0	1	0
	GN-12.2	0	0	0	0
	GN-14.2	0	0	2	0
May 2	TN	4	0	0	53
May 3	TN	-	-	-	-
May 4	TN	0	0	0	10
May 5	TN	0	0	4	197
	TOTAL	180	24	387	1209

Appendix II. Fish sampling data for Pine Lake, April and May, 1994.

DATE	SPECIES	WT (g)	FL (mm)	TAG #	SEX	AGE	KM	METHOD	COMMENTS
17-Apr-94	WALL	2745	636	A176	3	11	1.0-0.7	EL	observed 10 WALL, 3 NRPK, >50 YLPR
17-Apr-94	WALL	1535	541	A177	8	14	1.0-0.7	EL	
17-Apr-94	WALL	595	394	A178	8	5	1.0-0.7	EL	
17-Apr-94	WALL	930	432	A179	8	7	1.0-0.7	EL	
17-Apr-94	WALL	1330	488	A180	8	10	1.0-0.7	EL	
17-Apr-94	WALL	780	418	A181	8	6	1.0-0.7	EL	
17-Apr-94	WALL	1120	451	A182	0	6	1.0-0.7	EL	
17-Apr-94	WALL	705	411	A183	8	5	1.0-0.7	EL	
17-Apr-94	WALL	900	435	A184	8	6	1.0-0.7	EL	
17-Apr-94	WALL	610	386	A185	8	5	1.0-0.7	EL	
17-Apr-94	WALL	725	400	A186	9	5	1.0-0.7	EL	
17-Apr-94	WALL	1915	582	A187	8	16	1.0-0.7	EL	
17-Apr-94	WALL	755	416	A188	8	5	1.0-0.7	EL	
17-Apr-94	WALL	1590	527	A189	8	12	1.0-0.7	EL	
17-Apr-94	WALL	1450	491	A190	8	12	1.0-0.7	EL	
17-Apr-94	WALL	1255	481	A191	8	11	1.0-0.7	EL	
17-Apr-94	WALL	1120	470	A192	8	7	1.0-0.7	EL	
17-Apr-94	WALL	780	409	A193	9	7	1.0-0.7	EL	
17-Apr-94	WALL	1005	456	A194	8	7	1.0-0.7	EL	
17-Apr-94	WALL	760	407	A195	8	5	1.0-0.7	EL	
17-Apr-94	WALL	1775	549	A196	8	15	1.0-0.7	EL	
17-Apr-94	WALL	720	407	A197	8	6	1.0-0.7	EL	
17-Apr-94	WALL	410	350	A198	8	3	1.0-0.7	EL	
17-Apr-94	WALL	1130	457	A199	0	5	1.0-0.7	EL	
17-Apr-94	WALL	595	394	A200	9	5	1.0-0.7	EL	
17-Apr-94	WALL	875	434	A201	0	7	1.0-0.7	EL	
17-Apr-94	WALL	900	428	A167	8	6	2.0-1.0	EL	observed 1 WALL, 1 NRPK
17-Apr-94	WALL	785	423	A166	8	5	2.0-1.0	EL	
17-Apr-94	WALL	1415	508	A165	8	14	2.0-1.0	EL	
17-Apr-94	WALL	1285	478	A164	0	6	2.0-1.0	EL	
17-Apr-94	WALL	960	440	A163	8	5	2.0-1.0	EL	
17-Apr-94	WALL	690	408	A162	9	5	2.0-1.0	EL	
17-Apr-94	WALL	1725	538	A161	8	9	2.0-1.0	EL	
17-Apr-94	WALL	890	417	A160	8	5	2.0-1.0	EL	
17-Apr-94	WALL	1460	484	A159	0	7	2.0-1.0	EL	
17-Apr-94	WALL	1085	473	A158	8	7	2.0-1.0	EL	
17-Apr-94	WALL	660	391	A157	8	5	2.0-1.0	EL	
17-Apr-94	WALL	590	346	A155	8	5	2.0-1.0	EL	
17-Apr-94	NRPK	1020	521		9	5	3.0-2.0	EL	
17-Apr-94	NRPK	1510	584		3	5	3.0-2.0	EL	
17-Apr-94	WALL	1255	489	A168	8	9	3.0-2.0	EL	
17-Apr-94	WALL	1475	490	A171	3	7	3.5-3.0	EL	observed 1 NRPK
17-Apr-94	WALL	310	294	A170	0	4	3.5-3.0	EL	
17-Apr-94	WALL	2290	598	A169	3	12	3.5-3.0	EL	observed 1 NRPK
17-Apr-94	NRPK	35	190		0	1	4.0-3.0	EL	
17-Apr-94	NRPK	1245	558		8	6	4.0-3.0	EL	No fish
17-Apr-94	NRPK	1160	559		8	6	4.0-3.0	EL	
17-Apr-94	NRPK	1485	588		8	7	4.0-3.0	EL	No fish
17-Apr-94	NRPK	1575	604		8	6	4.0-3.0	EL	
17-Apr-94							4.0-3.5	EL	No fish
17-Apr-94	WALL	650	391	A172	0	4	4.5-4.0	EL	
17-Apr-94							5.0-4.5	EL	No fish, water temp 6.0°
18-Apr-94	WALL	765	404	A222	0	5	0.0-21.0	EL	
18-Apr-94	WALL	1385	488	A223	3	6	0.0-21.0	EL	observed 11 NRPK, 56 YLPR
18-Apr-94	WALL	385	331	A224	0	3	0.0-21.0	EL	
18-Apr-94	NRPK	295	335		0	2	0.5-0.0	EL	
18-Apr-94	NRPK	365	370		0	3	0.5-0.0	EL	

DATE	SPECIES	WT (g)	FL (mm)	TAG #	SEX	AGE	KM	METHOD	COMMENTS
18-Apr-94	NRPK	640	440		8	3	0.5-0.0	EL	
18-Apr-94	NRPK	770	487		8	5	0.5-0.0	EL	
18-Apr-94	NRPK	955	520		9	5	0.5-0.0	EL	
18-Apr-94	NRPK	1270	544		3	5	0.5-0.0	EL	
18-Apr-94	NRPK	2220	675		3	7	0.5-0.0	EL	
18-Apr-94	WALL	890	432	A219	0	5	0.5-0.0	EL	observed 25 NRPK, 37 YLPR
18-Apr-94	WALL	945	437	A220	0	6	0.5-0.0	EL	
18-Apr-94	WALL	955	440	A221	8	6	0.5-0.0	EL	
18-Apr-94	YLPR	175	213		0	5	0.5-0.0	EL	
18-Apr-94	YLPR	205	233		0	6	0.5-0.0	EL	
18-Apr-94	YLPR	190	217		0	7	0.5-0.0	EL	
18-Apr-94	YLPR	295	250		0	7	0.5-0.0	EL	
18-Apr-94	YLPR	20	108		8	3	0.5-0.0	EL	
18-Apr-94	YLPR	40	140		8	4	0.5-0.0	EL	
18-Apr-94	YLPR	130	208		8	7	0.5-0.0	EL	
18-Apr-94	YLPR	185	232		8	10	0.5-0.0	EL	
18-Apr-94	YLPR	100	186		9	6	0.5-0.0	EL	
18-Apr-94	WALL			A157	8		0.7-0.5	EL	RECAP, observed 3 YLPR, 2 WALL
18-Apr-94	WALL	1715	552	A202	8	14	0.7-0.5	EL	
18-Apr-94	WALL	1075	464	A203	8	7	0.7-0.5	EL	
18-Apr-94	WALL	645	392	A204	8	5	0.7-0.5	EL	
18-Apr-94	WALL	465	350	A205	0	3	0.7-0.5	EL	
18-Apr-94	WALL	610	382	A206	8	5	0.7-0.5	EL	
18-Apr-94	WALL	1450	507	A207	8	11	0.7-0.5	EL	
18-Apr-94	WALL	645	397	A208	9	6	0.7-0.5	EL	
18-Apr-94	WALL	925	436	A209	8	7	0.7-0.5	EL	
18-Apr-94	WALL	910	445	A210	8	6	0.7-0.5	EL	
18-Apr-94	WALL	690	404	A211	8	5	0.7-0.5	EL	
18-Apr-94	WALL	785	420	A212	8	5	0.7-0.5	EL	
18-Apr-94	WALL	1975	574	A213	8	15	0.7-0.5	EL	
18-Apr-94	WALL	900	439	A214	8	7	0.7-0.5	EL	
18-Apr-94	WALL	760	415	A215	8	6	0.7-0.5	EL	
18-Apr-94	WALL	845	418	A216	8	7	0.7-0.5	EL	
18-Apr-94	WALL	795	430	A217	8	6	0.7-0.5	EL	
18-Apr-94	WALL	595	387	A218	8	5	0.7-0.5	EL	
18-Apr-94	NRPK	575	417		4	3	1.0-0.5	EL	
18-Apr-94	NRPK	55	193		0	2	1.0-0.5	EL	
18-Apr-94	YLPR	40	142		0	4	1.0-0.5	EL	
18-Apr-94	YLPR	100	182		0	6	1.0-0.5	EL	
18-Apr-94	YLPR	200	230		0	7	1.0-0.5	EL	
18-Apr-94	YLPR	25	116		9	3	1.0-0.5	EL	
18-Apr-94	YLPR	35	139		9	4	1.0-0.5	EL	
18-Apr-94	YLPR	130	213		9	6	1.0-0.5	EL	
18-Apr-94	YLPR	175	223		9	10	1.0-0.5	EL	
18-Apr-94							17.0-16.0	EL	observed 2 NRPK, 2 YLPR
18-Apr-94							18.0-17.0	EL	
18-Apr-94							19.0-18.0	EL	
18-Apr-94							20.0-19.0	EL	
18-Apr-94							21.0-20.0	EL	
19-Apr-94	NRPK	1400	538		3	5	1.0-0.5	EL	
19-Apr-94	WALL	1365	484	A226	3	6	1.0-0.5	EL	observed 3 NRPK, 5 YLPR
19-Apr-94	WALL			A168	9		1.0-0.5	EL	
19-Apr-94	YLPR	120	191		0	5	1.0-0.5	EL	
19-Apr-94	YLPR	415	285		3	11	1.0-0.5	EL	
19-Apr-94	YLPR	50	147		9	4	1.0-0.5	EL	
19-Apr-94	WALL	365	334	A225	0	4	10.0-9.0	EL	observed 2 NRPK
19-Apr-94							11.0-10.0	EL	
19-Apr-94							12.0-11.0	EL	
19-Apr-94							13.0-12.0	EL	
19-Apr-94							14.0-13.0	EL	

DATE	SPECIES	WT (g)	FL (mm)	TAG #	SEX	AGE	KM	METHOD	COMMENTS
19-Apr-94							15.0-14.0	EL	observed 1 NRPK
19-Apr-94							16.0-15.0	EL	observed 2 NRPK
19-Apr-94							9.0-8.0	EL	observed 10 NRPK
21-Apr-94	NRPK	810	453		3	4	1.0-0.5	EL	
21-Apr-94	NRPK	1385	583		3	5	1.0-0.5	EL	
21-Apr-94	NRPK	1590	650		0	6	1.0-0.5	EL	
21-Apr-94	NRPK	945	546		3	5	1.0-0.5	EL	
21-Apr-94	WALL			A165	9		1.0-0.5	EL	RECAP; observed 2 WALL, 1 NRPK
21-Apr-94	WALL	465	367	A227	9	3	1.0-0.5	EL	
21-Apr-94	WALL	1245	498	A228	8	7	1.0-0.5	EL	
21-Apr-94	WALL	1290	481	A229	3	7	1.0-0.5	EL	
21-Apr-94	WALL	735	417	A230	8	5	1.0-0.5	EL	
21-Apr-94	WALL	565	390	A231	0	4	1.0-0.5	EL	
21-Apr-94	WALL	720	413	A232	9	5	1.0-0.5	EL	
21-Apr-94							14.5-14.0	EL	observed 2 NRPK, 2 YLPR
21-Apr-94	WALL	915	445	A241	0	5	5.0-4.0	EL	observed 10 NRPK, 5 YLPR
21-Apr-94	NRPK	745	481		10	4	6.0-5.0	EL	
21-Apr-94	NRPK	1330	532		5	5	6.0-5.0	EL	
21-Apr-94	NRPK	1255	535		3	5	6.0-5.0	EL	
21-Apr-94	NRPK	1060	543		8	5	6.0-5.0	EL	
21-Apr-94	NRPK	1165	562		5	4	6.0-5.0	EL	
21-Apr-94	NRPK	1910	635		5	6	6.0-5.0	EL	
21-Apr-94	NRPK	1985	641		5	6	6.0-5.0	EL	
21-Apr-94	NRPK	1835	662		5	6	6.0-5.0	EL	
21-Apr-94	NRPK	2805	729		0	7	6.0-5.0	EL	
21-Apr-94	WALL	1430	528	A234	3	7	6.0-5.0	EL	observed 17 NRPK, 9 YLPR; fish were caught mainly in or by the creek
21-Apr-94	WALL	1190	467	A235	9	7	6.0-5.0	EL	
21-Apr-94	WALL	435	347	A236	0	3	6.0-5.0	EL	
21-Apr-94	WALL	495	363	A237	0	3	6.0-5.0	EL	
21-Apr-94	WALL	770	440	A238	0	5	6.0-5.0	EL	
21-Apr-94	WALL	1345	496	A239	3	6	6.0-5.0	EL	
21-Apr-94	WALL	705	406	A240	9	5	6.0-5.0	EL	
21-Apr-94							7.0-6.0	EL	observed 7 NRPK, 1 YLPR
21-Apr-94	WALL	675	394	A233	9	5	8.0-7.0	EL	observed 8 NRPK
22-Apr-94	NRPK	1216	585		9	6	1.0-0.5	EL	
22-Apr-94	NRPK	1280	594		3	6	1.0-0.5	EL	
22-Apr-94	NRPK	2120	676		3	6	1.0-0.5	EL	
22-Apr-94	WALL			A190	9		1.0-0.5	EL	RECAP, observed 8 NRPK, 2 YLPR
22-Apr-94	WALL			A188	8		1.0-0.5	EL	RECAP
22-Apr-94	WALL			A208	9		1.0-0.5	EL	RECAP
22-Apr-94	WALL	1070	451	A267	3	6	1.0-0.5	EL	
22-Apr-94	WALL	935	461	A268	9	6	1.0-0.5	EL	
22-Apr-94	WALL	590	397	A269	0	5	1.0-0.5	EL	
22-Apr-94	WALL	920	464	A270	9	6	1.0-0.5	EL	
22-Apr-94	WALL	380	328	A271	0	3	1.0-0.5	EL	
22-Apr-94	WALL	365	322	A272	0	3	1.0-0.5	EL	
22-Apr-94	YLPR	45	150		9	4	1.0-0.5	EL	
22-Apr-94	YLPR	165	220		9	6	1.0-0.5	EL	
22-Apr-94	YLPR	120	200		9	6	1.0-0.5	EL	
22-Apr-94	WALL	2905	615	A258	5	16	20.5-20.0	EL	observed 3 WALL, 42 NRPK, 3 YLPR
22-Apr-94	WALL	785	417	A259	0		20.5-20.0	EL	
22-Apr-94	WALL	905	442	A260	0	4	20.5-20.0	EL	
22-Apr-94	WALL	910	424	A261	0	5	20.5-20.0	EL	
22-Apr-94	WALL	715	409	A262	0	5	20.5-20.0	EL	
22-Apr-94	WALL	415	347	A263	0	3	20.5-20.0	EL	
22-Apr-94	WALL	900	439	A264	0	6	20.5-20.0	EL	
22-Apr-94	WALL	690	402	A265	0	5	20.5-20.0	EL	
22-Apr-94	WALL	400	340	A266	0	3	20.5-20.0	EL	
22-Apr-94	YLPR	135	209		0	6	20.5-20.0	EL	

DATE	SPECIES	WT (g)	FL (mm)	TAG #	SEX	AGE	KM	METHOD	COMMENTS
22-Apr-94	NRPK	90	234		0	1	21.0-20.5	EL	
22-Apr-94	NRPK	520	418		10	3	21.0-20.5	EL	
22-Apr-94	NRPK	565	425		3	3	21.0-20.5	EL	
22-Apr-94	NRPK	795	475		0	4	21.0-20.5	EL	
22-Apr-94	NRPK	1570	575		3	6	21.0-20.5	EL	
22-Apr-94	WALL	820	417	A243	3	5	21.0-20.5	EL	observed 45 NRPK, 10 YLPR; most fish caught in the creek; water temp 10.0°
22-Apr-94	WALL	1295	495	A244	10	6	21.0-20.5	EL	
22-Apr-94	WALL	920	449	A245	9	7	21.0-20.5	EL	
22-Apr-94	WALL	590	378	A246	9	6	21.0-20.5	EL	
22-Apr-94	WALL	550	385	A247	9	5	21.0-20.5	EL	
22-Apr-94	WALL	685	408	A248	9	5	21.0-20.5	EL	
22-Apr-94	WALL	1220	445	A249	3	5	21.0-20.5	EL	
22-Apr-94	WALL			A223	3		21.0-20.5	EL	RECAP
22-Apr-94	WALL	715	396	A250	9	5	21.0-20.5	EL	
22-Apr-94	WALL	805	433	A251	9	5	21.0-20.5	EL	
22-Apr-94	WALL	855	411	A252	3	4	21.0-20.5	EL	
22-Apr-94	WALL	970	436	A253	3	5	21.0-20.5	EL	
22-Apr-94	WALL	705	420	A254	9	5	21.0-20.5	EL	
22-Apr-94	WALL	1305	490	A256	3	6	21.0-20.5	EL	
22-Apr-94	WALL	1155	463	A257	3	6	21.0-20.5	EL	
22-Apr-94	YLPR	75	171		5	5	21.0-20.5	EL	
22-Apr-94	NRPK	605	437		9	3	4.0-3.0	EL	
22-Apr-94	WALL	310	316	A242	0	3	4.0-3.0	EL	observed 2 NRPK; water temp 9.0°
22-Apr-94	YLPR	275	247		0	7	4.0-3.0	EL	
22-Apr-94	YLPR	110	196		3	5	4.0-3.0	EL	
22-Apr-94	YLPR	125	198		3	5	4.0-3.0	EL	
22-Apr-94	YLPR	165	213		3	6	4.0-3.0	EL	
23-Apr-94	WALL	1035	470	A300	9	6	1.0-0.5	EL	observed 2 NRPK, 1 YLPR
23-Apr-94	WALL			A188	9		1.0-0.5	EL	RECAP
23-Apr-94	WALL	810	422	A299	9	6	1.0-0.5	EL	
23-Apr-94	WALL	955	445	A276	9	7	1.0-0.5	EL	
23-Apr-94	WALL	650	390	A277	9	6	1.0-0.5	EL	
23-Apr-94	WALL	620	404	A278	9	5	1.0-0.5	EL	
23-Apr-94	NRPK	335	347		0	3	2.0-1.0	EL	
23-Apr-94	NRPK	1175	565		5	6	2.0-1.0	EL	
23-Apr-94	WALL	1390	471	A274	3	5	2.0-1.0	EL	observed 1 YLPR
23-Apr-94	WALL	670	390	A275	0	7	2.0-1.0	EL	
23-Apr-94	NRPK	1260	576		5	6	3.0-2.0	EL	
23-Apr-94	WALL	2485	591	A273	5	10	3.0-2.0	EL	observed 1 NRPK, 7.5°C
27-Apr-94	NRPK	390	376		0	3	0.6	TN	
27-Apr-94	YLPR	45	146		0	4	0.6	TN	
27-Apr-94	YLPR	35	144		0	4	0.6	TN	
27-Apr-94	YLPR	150	213		8	7	0.6	TN	
27-Apr-94	YLPR	15	104		9	3	0.6	TN	
27-Apr-94	YLPR	15	107		9	3	0.6	TN	
27-Apr-94	YLPR	35	144		9	4	0.6	TN	
27-Apr-94	YLPR	95	186		9	5	0.6	TN	
27-Apr-94	YLPR	70	166		9	5	0.6	TN	
27-Apr-94	YLPR	60	162		9	5	0.6	TN	
27-Apr-94	YLPR	75	176		9	5	0.6	TN	
27-Apr-94	YLPR	15	114		10	3	0.6	TN	
28-Apr-94	NRPK	665	441		0	3	0.6	TN	
28-Apr-94	NRPK	1030	538		10	5	0.6	TN	
28-Apr-94	NRPK	1215	540		0	5	0.6	TN	
28-Apr-94	WALL	890	435	A279	3	5	0.6	TN	64 YLPR, 3 NRPK; water temp 7.0°C
28-Apr-94	YLPR	115	201		5	6	0.6	TN	
28-Apr-94	YLPR	15	110		9	3	0.6	TN	
28-Apr-94	YLPR	15	113		9	3	0.6	TN	
28-Apr-94	YLPR	15	104		9	3	0.6	TN	

DATE	SPECIES	WT (g)	FL (mm)	TAG #	SEX	AGE	KM	METHOD	COMMENTS
28-Apr-94	YLPR	15	107		9	3	0.6	TN	
28-Apr-94	YLPR	10	98		9	3	0.6	TN	
28-Apr-94	YLPR	15	111		9	3	0.6	TN	
28-Apr-94	YLPR	50	160		9	4	0.6	TN	
28-Apr-94	YLPR	40	150		9	4	0.6	TN	
28-Apr-94	YLPR	30	135		9	4	0.6	TN	
28-Apr-94	YLPR	40	148		9	4	0.6	TN	
28-Apr-94	YLPR	45	152		9	4	0.6	TN	
28-Apr-94	YLPR	40	149		9	4	0.6	TN	
28-Apr-94	YLPR	35	145		9	4	0.6	TN	
28-Apr-94	YLPR	75	178		9	5	0.6	TN	
28-Apr-94	YLPR	70	179		9	5	0.6	TN	
28-Apr-94	WALL	1455	506	A285	5	7	20.8	EL	mouth of creek, observed 2 WALL, 32 NRPK, 11 YLPR
28-Apr-94	WALL	800	413	A284	0	6	1.0-0.0	EL	observed 15 NRPK, 7 YLPR
28-Apr-94	NRPK	465	384		10	3	2.0-1.0	EL	
28-Apr-94	NRPK	815	483		10	5	2.0-1.0	EL	
28-Apr-94	NRPK	905	511		0	5	2.0-1.0	EL	
28-Apr-94	NRPK	980	521		10	4	2.0-1.0	EL	
28-Apr-94	NRPK	1225	550		10	5	2.0-1.0	EL	
28-Apr-94	NRPK	1105	550		5	5	2.0-1.0	EL	
28-Apr-94	NRPK	1135	584		10	6	2.0-1.0	EL	
28-Apr-94	WALL	650	415	A280	9	5	2.0-1.0	EL	observed 5 NRPK, 4 YLPR
28-Apr-94	WALL	715	393	A281	9	6	2.0-1.0	EL	
28-Apr-94	WALL	1000	443	A282	3	7	2.0-1.0	EL	
28-Apr-94	WALL	335	319	A283	0	4	2.0-1.0	EL	
28-Apr-94	WALL	375	321	A286	0	3	21.0-20.5	EL	
28-Apr-94	WALL	405	339	A287	0	3	21.0-20.5	EL	
28-Apr-94	WALL	385	328	A288	0	3	21.0-20.5	EL	
28-Apr-94	NRPK	1265	530		8	6	4.0-3.0	EL	
29-Apr-94	NRPK	515	399		0	3	0.6	TN	
29-Apr-94	NRPK	615	432		9	3	0.6	TN	
29-Apr-94	NRPK	780	499		0	4	0.6	TN	
29-Apr-94	NRPK	1100	529		9	5	0.6	TN	
29-Apr-94	NRPK	1145	560		0	5	0.6	TN	
29-Apr-94	NRPK	2800	764		0	8	0.6	TN	
29-Apr-94	WALL	870	434	A290	4	6	0.6	TN	released 6 NRPK, 386 YLPR
29-Apr-94	WALL	895	448	A289	9	6	0.6	TN	
29-Apr-94	WALL	1125	492	A291	0	7	0.6	TN	
29-Apr-94	WALL	1305	480	A292	4	6	0.6	TN	
29-Apr-94	YLPR	5	81		9	2	0.6	TN	
29-Apr-94	YLPR	15	108		9	3	0.6	TN	
29-Apr-94	YLPR	15	106		9	3	0.6	TN	
29-Apr-94	YLPR	20	112		9	3	0.6	TN	
29-Apr-94	YLPR	40	148		9	4	0.6	TN	
29-Apr-94	YLPR	40	147		9	4	0.6	TN	
29-Apr-94	YLPR	60	167		9	5	0.6	TN	
29-Apr-94	YLPR	70	171		9	5	0.6	TN	
29-Apr-94	YLPR	65	178		9	5	0.6	TN	
29-Apr-94	YLPR	75	181		9	5	0.6	TN	
29-Apr-94	WALL	645	408	A302	10	5	1.0-0.5	EL	observed 12 NRPK, 2 YLPR
29-Apr-94	WALL	2205	537		0		1.0-0.5	EL	escaped, not tagged or sexed
29-Apr-94							15.0-14.0	EL	observed 4 NRPK, 1 YLPR
29-Apr-94	WALL	1335	494	A151	9	9	20.5-20.0	EL	observed 15 NRPK, 3 YLPR
29-Apr-94	WALL	1350	505	A149	0	6	20.5-20.0	EL	
29-Apr-94	WALL	640	398	A150	0	5	20.5-20.0	EL	
29-Apr-94	WALL	1050	463	A301	0	6	20.5-20.0	EL	
29-Apr-94	WALL	810	437	A 148	0	5	21.0-20.5	EL	
29-Apr-94	WALL			A251	10		21.0-20.5	EL	RECAP
29-Apr-94	WALL	1070	465	A255	9	7	21.0-20.5	EL	

DATE	SPECIES	WT (g)	FL (mm)	TAG #	SEX	AGE	KM	METHOD	COMMENTS
29-Apr-94	WALL	740	411	A147	0	5	21.0-20.5	EL	
29-Apr-94	WALL	1440	515	A152	0	7	21.0-20.5	EL	
29-Apr-94	WALL	965	440	A154	0	5	21.0-20.5	EL	
29-Apr-94	WALL	545	383	A156	9	5	21.0-20.5	EL	
29-Apr-94	WALL	830	442	A153	9	6	21.0-20.5	EL	
29-Apr-94	WALL	675	397	A293	9	5	6.0-5.0	EL	observed 1 WALL, 26 NRPK, 6 YLPR; all walleye caught in or near creek
29-Apr-94	WALL	670	415	A294	9	5	6.0-5.0	EL	
29-Apr-94	WALL	1150	464	A295	9	6	6.0-5.0	EL	
29-Apr-94	WALL	640	414	A296	8	5	6.0-5.0	EL	
29-Apr-94	WALL	955	458	A297	0	6	6.0-5.0	EL	
29-Apr-94	WALL	445	343	A298	0	3	6.0-5.0	EL	
30-Apr-94	NRPK	1035	582		10	6	0.6	TN	
30-Apr-94	NRPK	1700	614		5	6	0.6	TN	
30-Apr-94	WALL			A290	5		0.6	TN	RECAP, released 6 NRPK, 80 YLPR
30-Apr-94	WALL			A292	4		0.6	TN	RECAP
30-Apr-94	WALL	1060	468	A303	9	6	0.6	TN	
30-Apr-94	WALL	750	420	A304	9	6	0.6	TN	
30-Apr-94	YLPR	35	145		0	4	0.6	TN	
30-Apr-94	YLPR	140	198		3	6	0.6	TN	
30-Apr-94	YLPR	155	221		4	7	0.6	TN	
30-Apr-94	YLPR	340	291		5	10	0.6	TN	
30-Apr-94	YLPR	10	112		9	3	0.6	TN	
30-Apr-94	YLPR	10	103		9	3	0.6	TN	
30-Apr-94	YLPR	50	157		9	5	0.6	TN	
30-Apr-94	YLPR	80	180		9	5	0.6	TN	
30-Apr-94	YLPR	85	188		9	5	0.6	TN	
30-Apr-94	YLPR	150	221		9	7	0.6	TN	
01-May-94	NRPK	565	431		10	3	0.6	TN	
01-May-94	NRPK	705	454		9	3	0.6	TN	
01-May-94	NRPK	900	490		10	4	0.6	TN	
01-May-94	NRPK	1070	523		9	5	0.6	TN	
01-May-94	NRPK	1100	539		0	5	0.6	TN	
01-May-94	NRPK	1235	562		0	5	0.6	TN	
01-May-94	NRPK	1410	572		4	6	0.6	TN	
01-May-94	NRPK	1645	606		10	7	0.6	TN	
01-May-94	NRPK	1185	637		0	6	0.6	TN	
01-May-94	NRPK	1475	661		0	6	0.6	TN	
01-May-94	NRPK	2435	673		0	7	0.6	TN	
01-May-94	WALL	1120	450	A305	4	6	0.6	TN	released 4 NRPK, 186 YLPR
01-May-94	WALL	1465	510	A306	4	6	0.6	TN	
01-May-94	WALL	660	398	A307	9	5	0.6	TN	
01-May-94	WALL	860	419	A308	0	5	0.6	TN	
01-May-94	WALL	345	325	A309	0	3	0.6	TN	
01-May-94	YLPR	10	114		0	3	0.6	TN	
01-May-94	YLPR	20	121		0	3	0.6	TN	
01-May-94	YLPR	25	134		0	3	0.6	TN	
01-May-94	YLPR	30	128		0	3	0.6	TN	
01-May-94	YLPR	60	172		0	5	0.6	TN	
01-May-94	YLPR	85	186		0	6	0.6	TN	
01-May-94	YLPR	70	177		5	5	0.6	TN	
01-May-94	YLPR	150	223		9	7	0.6	TN	
01-May-94	YLPR	10	106		10	3	0.6	TN	
01-May-94	YLPR	40	144		10	4	0.6	TN	
01-May-94							0.6	GN	4 NRPK; 1.5-5.0m; 60 minutes
01-May-94							0.8	GN	6 NRPK; 1.3-1.8m; 55 minutes
01-May-94	WALL	1015	440	A311	0	6	1.3	GN	9 NRPK; 1.0-6.5m; 60 minutes
01-May-94	WALL	1105	448	A312	3	5	1.3	GN	
01-May-94	WALL	1540	530		9	13	1.3	GN	mortality
01-May-94	WALL	1140	462	A310	3	6	4	GN	1 NRPK; 1.3-4.0m; 35 minutes



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DATE	SPECIES	WT (g)	FL (mm)	TAG #	SEX	AGE	KM	METHOD	COMMENTS
01-May-94							12.2	GN	no fish; rock reef; 1.5m; 45 minutes
01-May-94							14.2	GN	2 NRPK; spawning bed; 1m; 30 minutes
02-May-94	NRPK	65	207		0	1	0.6	TN	
02-May-94	NRPK	600	432		10	3	0.6	TN	
02-May-94	NRPK	1030	524		10	5	0.6	TN	
02-May-94	NRPK	1075	548		0	5	0.6	TN	
02-May-94	NRPK	1420	583		10	6	0.6	TN	
02-May-94	NRPK	1540	594		0	6	0.6	TN	
02-May-94	NRPK	1875	637		0	6	0.6	TN	
02-May-94	NRPK	1745	639		0	6	0.6	TN	
02-May-94	WALL	740	404	A315	0	5	0.6	TN	released 53 YLPR
02-May-94	WALL	830	427	A316	0	5	0.6	TN	
02-May-94	WALL	1055	442	A317	3	5	0.6	TN	
02-May-94	WALL			A306	4		0.6	TN	RECAP; 53 YLPR
02-May-94	YLPR	60	177		0	5	0.6	TN	
02-May-94	YLPR	130	202		4	5	0.6	TN	
02-May-94	YLPR	70	179		9	5	0.6	TN	
02-May-94	YLPR	45	156		10	4	0.6	TN	
02-May-94	YLPR	40	164		10	4	0.6	TN	
02-May-94	YLPR	50	159		10	4	0.6	TN	
02-May-94	YLPR	50	167		10	4	0.6	TN	
02-May-94	YLPR	50	168		10	4	0.6	TN	
02-May-94	YLPR	70	173		10	5	0.6	TN	
02-May-94	YLPR	115	205		10	6	0.6	TN	
04-May-94	NRPK	50	207		0	1	0.6	TN	
04-May-94	YLPR	5	97		0	2	0.6	TN	
04-May-94	YLPR	20	116		0	3	0.6	TN	
04-May-94	YLPR	100	199		5	5	0.6	TN	
04-May-94	YLPR	260	264		5	7	0.6	TN	
04-May-94	YLPR	50	159		9	4	0.6	TN	
04-May-94	YLPR	40	152		10	4	0.6	TN	
04-May-94	YLPR	40	148		10	4	0.6	TN	
04-May-94	YLPR	35	150		10	4	0.6	TN	
04-May-94	YLPR	60	173		10	5	0.6	TN	
04-May-94	YLPR	85	187		10	5	0.6	TN	
04-May-94	YLPR	55	164		10	5	0.6	TN	
05-May-94	NRPK	1410	586		5	5	0.6	TN	
05-May-94	YLPR	10	102		10	3	0.6	TN	
05-May-94	YLPR	35	145		10	4	0.6	TN	
05-May-94	YLPR	35	139		10	4	0.6	TN	
05-May-94	YLPR	35	140		10	4	0.6	TN	
05-May-94	YLPR	45	155		10	4	0.6	TN	
05-May-94	YLPR	65	173		10	5	0.6	TN	
05-May-94	YLPR	80	186		10	5	0.6	TN	
05-May-94	YLPR	85	185		10	6	0.6	TN	